No. 7300074

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

World Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS CERTIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'W. S. 3'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* ninth *day of* January *in the year of our Lord one thousand nine hundred and* seventy-five

Attest:

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Earl L Butz

Secretary of Agriculture

Stage III. (Program to produce MP-3 CF and other tetroploid colored-grain varieties.)

1. T. ds. P. Arr. x [(F5, Yt 54-N 10 B x B. Y.) x Tc 60]

The above cross was made in Salinas, California, in 1966 and the F1 planted in the same location in 1966-1967 in order to produce F2 seeds to plant in Grand Forks, North Dakota, in 1967. The F2 was bulked and 100 rows (80 to 100 seeds to a row) were planted in Grand Forks, North Dakota, in 1967. There was practically no sterility in segregates from this interspecific cross, which indicates that at least some tetroploid species intercross rather freely. A total of 580 individual F3 plant selections were made out of the F2 population. Field records taken at the time of selection plus further field and laboratory observations indicate that this wide cross shows the following characteristics:

a. Kernel colors vary from purple to amber.

b. Branching spikes (somewhat different from the types observed in crosses with some Turgidum species).

c. Great tillering ability.

d. Strong root system.

e. Variations in maturity but early types rarely found.

f. Good segregation for rust resistance, although very few have survived to the new strains which appeared around 1970.

g. Moderately resistant to Septoria. Needs better tolerance.

h. Number 1 yielder among thousands of single F3 plants selected in 1967 from 129 different F2 populations. This statement was found to be absolutely true. Yield Trials conducted under irrigation in Holtville, California in 1970-1971 and 1971-1972 show that some lines derived from this cross yield up to 67% over World Seeds 1651.

i. Grain protein is on the low side, needs some improvement.

(Stage III... cont'd.)

In order to speed up this program, single F3 colored grain plants were planted in a greenhouse in Encinitas, California, in 1967-1968. Dr. Frank Peto, World Seeds Consultant for Canada, made single F4 head selections and planted them in Ladner, British Columbia, Canada, in 1968. The best plants from the F4 and succeeding generations have been planted back and forth in Grand Forks, North Dakota, and in California and have been handled according to the pedigree method of individual plant selection.

The final cross and pedigree for MP-3 CF stands as follows:

Cross: T. ds. P. Arr. x [(F5, Yt 54-N 10 B x B. Y.) x Tc 60]

Pedigree: F8 Bulk:

4W02466-285-13-2B-1314-11-1B

In the pedigree, numbers 1 and 2 stands for selections made under California and North Dakota conditions, respectively. The Capital B letter stands for "Bulk."

Abbreviations:

Stage I.

Yt 54 = Yaktana 54; Mexican bread wheat, released in 1954.

N 10 B = Norin 10 x Brevor; semi-dwarf bread wheat, introduced into Mexico from Pullman, Washington.

B. Y. = Barrigon Yaqui; variety grown in the Pacific Northwest of Mexico for a number of years. Derivative from T. Turgidum (tetroploid group) and introduced into Mexico by the Spaniards. Apparently it originated in North Africa.

Tc 60 = Tehuacan 60; first tall durum variety-released in Mexico in 1960.

Stage II.

Z-B = Zenati x Bouteille; early durum line from France introduced by North Dakota State University, Fargo, North Dakota.

(Z-B) x W = (Zenati x Bouteille) x Wells; cross made at Fargo, North Dakota.

(Z-B) x Lk = (Zenati x Bouteille) x Lakota; cross made at Fargo, North Dakota.

Stage III.

T. ds. P. Arr. = Triticum dicoccoides, Var. Pseudo-Arrasita; wild tetroploid species with violet-colored kernels and spring habit.

12A.(2) Exhibit A. W.S.3.

a. Type and Frequency of Variants.

W.S.3 is very homozygous for general field agronomic characteristics such as heading, ripening and height; therefore, no variants should be found during the multiplication process.

Any off-types must be explained on the basis of mechanical mixtures during planting and harvesting. Natural hybrids may also appear during multiplication, but they can be explained on the basis of natural crosses of W.S.3 with other wheat varieties.

b. Evidence of Stability.

For evidence of the stability of W.S.3 you are referred to Tables 12B.(3) and 12D.(4) of this report. The agronomic characteristics of W.S.3 are very stable when grown under either irrigation or dry-land farming conditions.

12A.
(2)

Summary of Seed Production

Certified classes of seed are being produced on ground where no wheat has been grown for at least two years. We usually use land that has been under sugar beets, potatoes, alfalfa or cotton.

A roguing crew begins pulling off-types at heading and continues until the variety is ripe, at which stage some similar plants but clearly off-types can be spotted. The roguing crew inspects the field two or three times, depending on the number of off-types present in a particular field.

MP-3 CF is very stable for height, heading and maturity.

Not much contamination should be expected except for a few mechanical mixtures and natural hybrids resulting from crosses with other tetroploid spring or winter wheats.

Since MP-3 CF belongs in the tetroploid group, one may find occasionally some highly sterile natural hybrids resulting from crosses with bread wheats.

12B.
(1)

MP-3 CF possesses a distinctive characteristic which distinguishes it from any other spring wheat variety being grown today, not only in the United States but in the entire world. MP-3 CF produces purple grains and has short straw; thus, MP-3 CF can be grown even in those areas traditionally devoted to growing top quality bread or macaroni wheats exclusively. Because of its purple grains it can be easily identified at the elevator from any other variety.

MP-3 CF has shown a great yield potential, particularly under irrigation. Two years' average shows that MP-3 CF outyields World Seeds 1651 by 45%. To the author's knowledge, such increments in yield, especially over an already high-yielding variety such as World Seeds 1651, have never been heard of in wheat breeding history.

MP-3 CF possesses a strong straw, is very resistant to shattering, and so far has shown good field resistance to prevalent races of stem and leaf rusts.

MP-3 CF has two weaknesses: grain protein is on the low side, and it needs a better tolerance to Septoria leaf diseases.

Botanical Classification of MP-3 [1]

I. Plant Character :

1. Heading, physiologic maturity and height of MP-3 and standard varieties grown under irrigation in Holtville, California during the growing seasons of 1970-1971 and 1971-1972.

Variety	Heading	Physiologic Maturity* In Days	Height in Cm.	Height in Inches
MP-3	114	158	87	34.25
W. S. 1651	108	152	91	35.83
Red River 68	105	152	99	39.00

* The stage at which the peduncles (neck) turns yellow but the variety is from two to three weeks away from mechanical harvesting.

2. Height: Mid-tall. Field observations indicate MP-3 carries a single major gene for dwarfness.

3. Maturity: Mid-season

4. Habit of growth: Spring habit

II. Stem Character :

1. Color: White

2. Strength: Strong

3. Hollowness: Hollow

III. Spike Character :

1. Awnedness: Awned, awns white;average of extreme lengths, 14 cm.
2. Shape: Oblong
3. Density: Mid-dense
4. Position: Inclined
5. Shattering: Very resistant

*IV. Glume Character : (glabrous)

1. Color: White
2. Length: Long
3. Width: Wide

V. Shoulder Character :

1. Width: Narrow
2. Shape: Elevated

VI. Beak Character :

1. Width: Narrow
2. Shape: Acuminate
3. Length: 3.7 mm. average (2 mm. minimum; 6 mm. maximum)

* All of the observations in Items IV through X were made on the central one-third of the spike. Kernel characteristics were observed on ly on those grains from the two largest florets in each spikelet.

VII. Kernel Characters:

1. Color: Purple (Light or dark under hot or cool weather conditions, respectively. Shade variations on the same spike can also be observed.)

2. Length: Long (8.0 mm. average)

3. Texture: Hard

4. Shape: Elliptical, shrunken (even under optimum growing conditions) and slightly keeled on the dorsal surface.

VIII. Germ Character:

1. Size: Mid-sized

IX. Crease Characters:

1. Width: Wide

2. Depth: Deep

3. Dark spot by the tip.

X. Cheek Character:

1. Shape: Mainly angular but a few kernels with rounded cheeks can also be observed.

XI. Brush Character:

1. Collar: Non-collared (Brush is practically non-existant in this variety)

(1) Reference consulted:

BRIGGLE, L. W. and L. P. REITZ, 1963. Classification of Triticum species and of Wheat Varieties Grown in the United States. Tech. Bull. 1278, U.S.D.A.

Application No. 73074

Temporary Designation = MP-3 CF
Variety Name = W. S. 3

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-6
(2-15-73)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
WORLD SEEDS, INC.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
2605 Oceanside Blvd.
Oceanside, California 92054

FOR OFFICIAL USE ONLY

PVPO NUMBER

VARIETY NAME OR TEMPORARY DESIGNATION
W.S. 3 xe

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (*e.g.* [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[2] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[1] 1 = SPRING 2 = WINTER 3 = OTHER *(Specify)* _____

[2] 1 = SOFT 2 = HARD 3 = OTHER *(Specify)* _____

[3] 1 = WHITE 2 = RED 3 = OTHER *(Specify)* Purple

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[0][4][5] FIRST FLOWERING

[0][5][5] LAST FLOWERING

4. MATURITY *(50% Flowering)*:

[ ][ ] NO. OF DAYS *EARLIER* THAN .....

[0][2] NO. OF DAYS *LATER* THAN .....

[ ] [3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT *(From soil level to top of head)*:

[0][7][1] CM. HIGH

[ ][ ] CM. TALLER THAN .....

[1][8] CM. SHORTER THAN .....

[ ] [3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING *(See reverse)*:

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[0][4] NO. OF NODES *(Originating from node above ground)*

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[1][3] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER *(Specify)*: _____

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2][0] MM. LEAF WIDTH *(First leaf below flag leaf)*

[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[3][4] CM. LEAF LENGTH *(First leaf below flag leaf)*:

12D. (14) Exhibit D. W. S. 3.

Basis of Novelty

A unique characteristic of W. S. 3 spring wheat variety is that it produces purple-colored kernels. This characteristic alone constitutes a novelty which no other variety growing at the present time possesses.

12E. Exhibit E, Statement of the Basis of Applicant's Ownership.

The applicant is the employer of the breeder.

FORM GR-470
(2-12-71)

UNITED STATES DEPARTMENT OF AGRICULTURE
CONSUMER AND MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION	2. KIND NAME	FOR OFFICIAL USE ONLY	
~~MP-3-CF~~ W.S.-3	Durum Feed Wheat	VPO NUMBER 73074	
3. GENUS AND SPECIES NAME	4. FAMILY NAME *(Botanical)*	FILING DATE 3-15-73	TIME 11:00 A.M.
Triticum durum Desf.	Gramineae		
	5. DATE OF DETERMINATION July, 1971	FEE RECEIVED $ 750	CHARGES

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
WORLD SEEDS, INC.	2605 Oceanside Boulevard Oceanside, California 92054	Area Code 714 757-5647

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. STATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	Minnesota	Aug. 1, 1972

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:

Virgil R. Smith, President
World Seeds, Inc.
Professional Building, 172 Main Street
Winona, Minnesota 55987

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [X] 12A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52, P.L. 91-577)*
- [X] 12B. Exhibit B, Botanical Description of the Variety
- [X] 12C. Exhibit C, Objective Description of the Variety
- [X] 12D. Exhibit D, Data Indicative of Novelty
- [X] 12E. Exhibit E, Statement of the Basis of Applicant's Ownership

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable. *(See Section 52, P.L. 91-577).*

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? *(See Section 83(a), P.L. 91-577) (If "Yes," answer 14B and 14C below.)* [X] YES [X] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations?	14C. If "Yes," to 14B, how many generations of production beyond breeder seed?
[X] YES [ ] NO	3

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act (P.L. 91-577).

3/1/73
(DATE)

Virgil R. Smith
President (SIGNATURE OF APPLICANT)

February 27, 1973
(DATE)

(SIGNATURE OF APPLICANT)
Vice President - Research

FORM GR-470-6 (REVERSE)

11. HEAD:

[3] Density: 1 = LAX 2 = DENSE 3 = Mid-dense

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER *(Specify)* _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER *(Specify)*: _____

[1][3] CM. LENGTH

[1][3] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT *(CA. 7 mm.)* 2 = MEDIUM *(CA. 8 mm.)* 3 = LONG *(CA. 9 mm.)*

[3] Width: 1 = NARROW *(CA. 3 mm.)* 2 = MEDIUM *(CA. 3.5 mm.)* 3 = WIDE *(CA. 4 mm.)*

[5] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[2] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[3] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

*A few kernels with 1.

[3] Shape; 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[2*] Cheek: 1 = ROUNDED 2 = ANGULAR

[4] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG 4 = None

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[2] Phenol reaction *(See instructions)*: 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[4] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER *(Specify)* _____

[0][8] MM. LENGTH

[0][3.3] MM. WIDTH

[5][1] GM. PER 1000 SEEDS

17. SEED CREASE:

[3] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[3] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR [illegible] OF KERNEL 'LEMHI' more

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST *(Races)* _____

[2] LEAF RUST *(Races)* _____

[0] STRIPE RUST *(Races)* _____

[0] LOOSE SMUT

[0] POWDERY MILDEW

[0] BUNT

[ ] OTHER *(Specify)* _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY

[1] APHID *(Bydv.)*

[0] GREEN BUG

[0] CEREAL LEAF BEETLE

[ ] OTHER *(Specify)* _____

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering		Seed size	
Leaf size		Seed shape	
Leaf color		Coleoptile elongation	
Leaf carriage		Seedling pigmentation	

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. *(See attachment.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.